

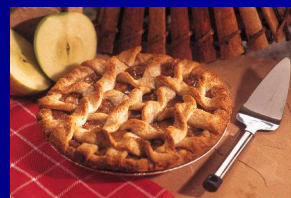
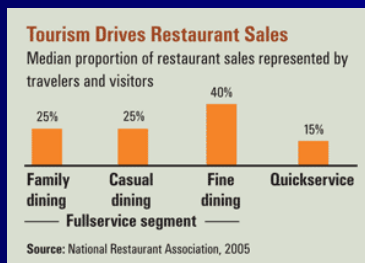
## Food Services Efficiency "Recipes for Success"



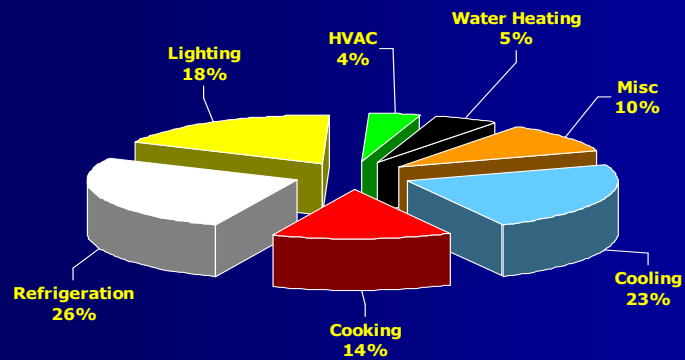
**Hawaiian Electric Company  
Steve Chang  
February 21, 2007**

## Hawaii Food Industry Facts

- Employment: 83,000
- Food Service Facilities in Hawaii: 4,000
- 2006 Restaurant Sales: \$2.8 billion



# Food Industry Energy Pie Chart



## Tale of Two Restaurants

1



2



# TOP TEN

## ■ Energy Conservation Measures (ECMs) for the Food Service Industry



### ECM Evaluation Tools

- Energy Star Calculator
- PG&E Food Service Technology Center
- HECO Case Study

## #10 - Fryers

<u>Item</u>	<u>ENERGY STAR</u>	<u>Standard</u>
<b>First Cost</b>	<b>\$3,000</b>	<b>\$2,500</b>
<b>Energy use (kwh/yr)</b>	<b>13,860</b>	<b>14,585</b>
<b>Energy Cost (\$/yr)</b>	<b>\$2,495</b>	<b>\$2,625</b>
<b>Net life cycle cost</b>	<b>\$19,797</b>	<b>\$20,175</b>

Annual Savings = \$130  
Simple Payback = 3.8 years

Assumptions: Electric Rate = \$0.18/kwh  
125 lb/day, 12 hr/day

Result: Net Life Cycle Cost Savings = \$379

Source: ENERGY STAR Calculator



## #9 - Freezers

<u>Item</u>	<u>ENERGY STAR</u>	<u>Standard</u>
First Cost	\$2,500	\$2,300
Energy use (kwh/yr)	3,818	5,201
Energy Cost (\$/yr)	\$687	\$936
Net life cycle cost	\$8,013	\$9,894

Annual Savings = \$250  
Simple Payback = 0.8 years

Assumptions: Electric Rate = \$0.18/kwh  
Size: 22.7 cu. ft. freezer

Result: Net Life Cycle Cost Savings exceeds \$1,800 &

Source: ENERGY STAR Calculator



## #8 - Griddles

### Energy Efficiency for 3-foot Griddles

	<u>Electric</u>	<u>Low-Eff Gas</u>	<u>Std-Eff Gas</u>	<u>High-Eff Gas</u>
Rated Energy Input (kBtu/h)	25-60	40-80	40-80	60-80
Cooking-Energy Efficiency (%)	65-75	25-35	35-45	>45
Idle Energy Rate (kBtu/h)	5-9	>18	15-18	10-15

Annual Savings = \$300  
Standard efficiency electric vs. High efficiency electric griddle

Recommendation: Pre-Heat 15 minutes or less

Source: Food Service Technology Center (PG&E)



## #7 - Refrigerators

<u>Item</u>	<u>ENERGY STAR</u>	<u>Standard</u>
First Cost	\$2,750	\$2,250
Energy use (kwh/yr)	2,332	4,300
Energy Cost (\$/yr)	\$420	\$774
Net life cycle cost	\$6,155	\$8,527

Annual Savings = \$350  
Simple Payback = 1.4 years

Assumptions: Electric Rate = \$0.18/kwh  
Size: 43.5 cu. ft. refrigerator

Result: Net Life Cycle Cost Savings exceeds \$2,000

Source: ENERGY STAR Calculator



## #6 - Ovens

Annual Savings = \$400  
Standard Efficiency vs. High Efficiency

### Tips

- Cut idle time
- Keep it full
- Replace seals and tighten hinges

Source: PG&E Food Service Technology



## #5 - Ice Machines

**Annual Savings = \$440**

Standard Efficiency vs High Efficiency

- Shift ice production to off-peak hours
- Bin shoots are interchangeable
- Reduce Demand charge

Source: PG&E Food Technology Center



## #4 - Lighting



<u>Item</u>	<u>ENERGY STAR</u>	<u>Standard</u>
First Cost	\$3.50/ea	\$0.50/ea
Energy use (kwh/yr)	569	2,628
Energy Cost (\$/yr)	\$102	\$541
Net life cycle cost	\$407	\$1,969

**Annual Savings = \$440**

Simple Payback = 0.1 years

Assumptions: Electric Rate = \$0.18/kwh  
Ten - 60 W Incandescent -> 23 W CFLs

Result: Net Life Cycle Cost Savings exceeds \$1,500

Source: ENERGY STAR Calculator

## #3 Air Conditioning Package Unit / Air Cooled Chillers



Unit Size (Tons)	Unit Size (MBtuh)	CODE Minimum Full Load Efficiency (SEER)		HECO Qualifying		Equipment Option A		Equipment Option B		Equipment Option C					
		Packaged	Split System	Full Load Efficiency <sup>1</sup>	Saving/Year (vs. CODE <sup>2</sup> )	Full Load Efficiency <sup>1</sup>	Saving/Year (Equipment vs. CODE <sup>2</sup> )	Full Load Efficiency <sup>1</sup>	Saving/Year (Equipment vs. CODE <sup>2</sup> )	Full Load Efficiency <sup>1</sup>	Saving/Year (Equipment vs. CODE <sup>2</sup> )				
0.5	6	9.7	10.0	13.0	SEER	\$47	14.0	SEER	\$58	16.0	SEER	\$76	18.0	SEER	\$90
0.75	9	9.7	10.0	13.0	SEER	\$70	14.0	SEER	\$87	16.0	SEER	\$114	18.0	SEER	\$135
1	12	9.7	10.0	13.0	SEER	\$93	14.0	SEER	\$116	16.0	SEER	\$152	18.0	SEER	\$180
1.5	18	9.7	10.0	13.0	SEER	\$140	14.0	SEER	\$173	16.0	SEER	\$227	18.0	SEER	\$270
2	24	9.7	10.0	13.0	SEER	\$187	14.0	SEER	\$231	16.0	SEER	\$303	18.0	SEER	\$359
3	36	9.7	10.0	13.0	SEER	\$280	14.0	SEER	\$347	16.0	SEER	\$455	18.0	SEER	\$539
4	48	9.7	10.0	13.0	SEER	\$373	14.0	SEER	\$462	16.0	SEER	\$607	18.0	SEER	\$719
5	60	9.7	10.0	13.0	SEER	\$467	14.0	SEER	\$578	16.0	SEER	\$758	18.0	SEER	\$899
6	72	10.3	10.3	11.0	EER	\$150	11.5	EER	\$246	12.0	EER	\$324	13.0	EER	\$489
7.5	90	10.3	10.3	11.0	EER	\$187	11.5	EER	\$307	12.0	EER	\$417	13.0	EER	\$612
8.5	102	10.3	10.3	11.0	EER	\$212	11.5	EER	\$348	12.0	EER	\$473	13.0	EER	\$693
10	120	10.3	10.3	11.0	EER	\$250	11.5	EER	\$410	12.0	EER	\$556	13.0	EER	\$815
12.5	150	9.7	9.7	10.8	EER	\$531	11.5	EER	\$816	12.0	EER	\$999	13.0	EER	\$1,323
15	180	9.7	9.7	10.8	EER	\$637	11.5	EER	\$979	12.0	EER	\$1,198	13.0	EER	\$1,587
17.5	216	9.7	9.7	10.8	EER	\$764	11.5	EER	\$1,174	12.0	EER	\$1,438	13.0	EER	\$1,905
20	240	9.5	9.5	10.8	EER	\$1,025	11.5	EER	\$1,480	12.0	EER	\$1,773	13.0	EER	\$2,292
25	300	9.5	9.5	10.0	EER	\$532	11.5	EER	\$1,851	12.0	EER	\$2,217	13.0	EER	\$2,865

Notes: <sup>1</sup>Efficiency listed in Table for comparison purposes only, does not represent any actual model efficiency. Some model efficiencies may not be available.

<sup>2</sup>Saving/Year based on the following assumptions: Hours/Day = 12 Days/Week = 6 Weeks/Year = 52  
AC Load Factor = 50% Electric Rate = \$0.180 /kWh

## #2 - Exhaust Fans



Case Study: Installed three (3) commercial kitchen ventilation (CKV) systems

### Results

Energy Savings = 41,081 kwh

Annual Savings = \$7,500 (\$2,500/unit)

Source: Hawaiian Electric Company (Melink Corp)

## #1 - Dishwashers

### Low-flow, pre-rinse sprayer

Item	New Sprayer	Conventional Sprayer
Water use	1.6 gpm	2.6 gpm
Annual water use (gal)	52,560	85,410
Annual water cost	\$140	\$228
Annual sewer cost	\$210	\$342
Annual water heating cost	\$1,701	\$2,765
Overall annual cost	\$2,051	\$3,335

**Total Annual Savings = \$1,300** (from a \$60 investment!)

Assumptions: \$2/100 cf of water costs, \$3/100 cf of sewer costs  
2 hours/day of active use  
Electric Rate = \$0.18/kwh

Source: PG&E Food Service Technology Center Calculator Tool



## A Tale of Two Restaurants



Equipment	Restaurant 1	Restaurant 2	Savings/Year Restaurant 1
FRYER	ENERGY STAR	STANDARD	\$ 130
FREEZER	ENERGY STAR	STANDARD	\$ 250
GRIDDLE	HIGH EFFICIENCY	STANDARD	\$ 300
REFRIGERATOR	ENERGY STAR	STANDARD	\$ 350
OVEN	HIGH EFFICIENCY	STANDARD	\$ 400
ICE MACHINE	HIGH EFFICIENCY	STANDARD	\$ 440
LIGHTING	10- CFL (23W)	10- INCAN (60W)	\$ 440
HVAC	HIGH EFFICIENCY	STANDARD	\$1,025
EXHAUST FANS	WITH CONTROLS	W/O CONTROLS	\$2,500
DISHWASHING	LOW-FLOW	STANDARD	\$1,300

**Total Annual Savings**

**\$7,135**



## Resources

- [www.fishnick.com](http://www.fishnick.com)  
(PG&E Food Service Technology Center)
- [www.energystar.gov](http://www.energystar.gov)
- [www.heco.com](http://www.heco.com)
- 2007 Hawaii Lodging, Hospitality & Foodservice Expo  
July 11-12 (Blaisdell)



# Mahalo!

